SYSTEM AND METHOD FOR AUTOMATIC SWITCHING TO INTERACTIVE APPLICATION DURING TELEVISION PROGRAM BREAKS

BACKGROUND OF THE INVENTION

1. Field of Invention

This invention relates generally to the field of television program receivers and receiving, and specifically to systems and methods which enable identification and replacement of commercial breaks in television programs.

2. Description of Related Art

The television industry has developed and thrived due to the sponsoring of entertainment programming by commercial interests. These commercial interests have resulted in the interruption of entertainment programming with advertising program segments, commonly referred to as commercials. Often, a number of individual commercials are "run" consecutively, interrupting the entertainment programming for an extended period of time. This is what is commonly referred to as a commercial break.

Many television viewers dislike commercial advertising and prefer to spend the time during commercial breaks performing alternative activities. However, because viewers do no want to miss substantial amounts of the entertainment programming they are viewing, and because commercial breaks last only a limited amount of time, viewers often do not want to watch an alternate entertainment program during commercial breaks. As used to describe the present invention, an entertainment program can be a television broadcast program, a DVD program, a VCR program, or any other program in which a person is merely a passive viewer. Watching an alternate entertainment program only during the commercial breaks of the desired entertainment program results in either a majority of the alternate entertainment program being missed or watching only short segments of the alternate entertainment program scattered over a considerable amount of time. Both are undesirable and often result in the viewer being unsatisfied and unentertained by the alternate entertainment program.

Currently, a number of approaches and methods exist for automatically identifying and replacing or editing the commercial break segments of television programming., for example see U.S. Pat. 5,973,723, DeLuca; U.S. Pat. 4,750,213, Novak; U.S. Pat. 6,011,537, 443, Iggulldden; U.S. Pat. 5,999,689 Iggulldden; and U.S. Pat. 5,818,440, Alibhoy, et al. While these prior art teachings disclose a variety of methods for automatically replacing the display of commercials, all of these prior art methods and apparatus teach replacing the commercial break programming with an alternate entertainment program such as a television broadcast program, a VCR program, a DVD program, or the like. For the reasons discussed above, all of these options are unsatisfactory.

Prior systems for detecting television commercial breaks have been suggested for use in VCR's wherein a videotape recording of a television broadcast can be played on the VCR, and commercials can be identified and skipped. Generally, such VCR systems can identify a certain signal or change in signal included in television broadcasts which signifies the beginning or end of a commercial break. Such VCR systems often output a blank or blue signal during the identified commercial breaks so that a user sees a blank screen during recorded commercial breaks when replaying a recorded broadcast television program. Digital VCR systems such as sold under the trademark TIVO can also be adapted to identify such commercial breaks and skip them during digital playback of user recorded television programs.

Systems which mute the sound or blank the screen during commercial breaks in television programming have also been suggested for television receivers, but such systems have not become readily available because there is no ability to fast forward while watching a program at the time it is being broadcast. Thus, a need still exists to provide viewers who wish to avoid watching commercial breaks with a satisfactory activity that can be performed during commercial breaks without resulting in the viewer missing a substantial amount of the desired television program.

An interactive application is any software program the execution of which is controlled by choices made by the user. Common examples of interactive applications are video games, word processors, spread sheet programs, and internet browser programs. Depending on the type and use of the interactive application involved, interactive application can be used for an almost endless number of purposes, ranging from performing employment related tasks to serving purely recreational purposes.

As a result of this diversity of uses, many people spend considerable amounts of time operating interactive applications by either necessity or pure desire. Moreover, many of these people are the same exact people who wish to avoid watching television commercial breaks. Thus, there is a current need to provide television viewers with a method and apparatus that automatically replaces television commercial breaks with an interactive application.

However, because commercial breaks only last a limited amount of time, and because user's objective in operating an interactive application often takes a longer time to meet than any single commercial break, there is also a need for the user to be able to progressively operate the interactive application (i.e. continue from the user's previous point of operation) during subsequent commercial breaks. Moreover, because a user does not know when a commercial break is going to end, and because many interactive applications require constant user attention and continuous user control, a need exists for automatically pausing (i.e. saving a user's progress in executing) the interactive application when a television commercial break ends.

SUMMARY OF THE INVENTION

These needs and others are met by the present invention which comprises in one aspect system for replacing commercial break portions of television programming with an interactive application. The system detects the beginning of commercial breaks and automatically replaces the commercial breaks with an interactive application operable by the viewer. Preferably, the system automatically returns the viewer's display back to the

television program upon detecting or determining the end of the commercial break. Alternatively, the viewer's display will not return back to the television program until the viewer manually elects to do so.

Preferably, the viewer's progress in executing the interactive application is automatically saved at the end of a commercial break or when the viewer elects to return to the television program. The interactive application will then be redisplayed at the beginning of the next commercial break from this saved point of progress, thus allowing the viewer to progressively operate the interactive application during subsequent commercial breaks without missing any substantial portion of the desired television program.

The system comprises an interactive application module capable of executing an interactive application program and generating output data; a television program module that generates a television program signal; an input module for entering user input commands into the interactive application module; a break detection module adapted to detect television commercial breaks in the television program signal and generate a break beginning signal; a display module having a primary display area capable of receiving the television program signal and the interactive application program output data and displaying a primary image corresponding to either the television program signal or the interactive application program output data; and a switching module that switches the primary display image to the interactive application output data upon receiving the break beginning signal so that upon detecting the beginning of a television commercial break the interactive application is automatically presented in the primary display area.

Optionally, the break detection module can be further adapted to generate a break end signal either automatically upon detecting or determining the end of the television commercial break or manually upon a viewer's election, wherein the switching module will switch the primary display image back to the television program signal upon receiving the break end signal so that the television program signal is presented in the primary display area.

The television program module can be a television receiver, a satellite receiver, a VCR, an HDD receiver, or the like. The interactive application program can be a video game program, a word processor program, a spreadsheet program, an internet browser program or the like, and the input module can be a keyboard, mouse, or hand-held controller.

The interactive application module preferably includes a program memory for storing the interactive application program; a central processing unit which executes the interactive application program in accordance to the user input commands; an input command interface for receiving the user input commands from the input module and transferring the user input commands to the central processing unit; a pause memory for storing a user's point of progress in executing the interactive application program; a data output for outputting image and sound data in accordance with the execution of the interactive application program.

Preferably a user's point of progress in executing the interactive application program is automatically stored in the pause memory when the switching module switches the display of the primary display area to the television program, wherein execution of the interactive application program is resumed from the user's stored point of progress in the pause memory when the switching module switches the display of the primary display area back to the interactive application.

The input command interface can be an infrared photosensor and the input module can be one or more hand held remote controllers which emit infrared signals. The interactive application module can have a program memory, where the program memory is typically a CD-ROM, magnetic disc, integrated circuit, and/or hard drive. The system can download interactive application programs from a remote source, for example a remote site on the internet, which stores a multitude of interactive application programs to local memory in, for example a game module or personal computer. The input module can be used to control the selection and downloading of specific programs from the remote source.

The system can further include a means to deactivate the switching module so that the television program signal or the interactive application output data can be permanently displayed as the primary image.

In another embodiment, the invention is a method for executing an interactive application program during television commercial breaks. The inventive method comprises the steps of: providing a television program module which generates a television program signal; providing an interactive application module adapted to receive user input commands and generate output data according to an interactive application program; providing a break detection module to detect the beginning of television commercial breaks in the television program signal; and presenting the television program in a primary display area of a display module until the beginning of a television commercial break is detected and then presenting the interactive application in the primary display area.

Optionally, the break detection module can also detect the end of television commercial breaks, thus allowing the interactive application to be presented in the primary display area until the end of the television commercial break is detected and then presenting the television program in the primary display area.

Preferably, in practicing this method of invention the interactive application module comprises a program memory for storing the interactive application program, a central processing unit which executes the interactive application program in accordance to the user input commands, an input command interface for receiving the user input commands from an input module and transferring the user input commands to the central processing unit, a pause memory for storing a user's point of progress in executing the interactive application program, and a data output means for outputting image and sound data in accordance with the execution of the interactive application program.

Also preferably, the method of invention further comprises the step of automatically storing a user's point of progress in executing the interactive application program in the pause

memory when the television program is presented in the primary display area, wherein execution of the interactive application program is resumed from the user's stored point of progress in the pause memory when the interactive application is presented in the primary display area.

Optionally, the interactive application programs can be downloaded to and stored locally in the program memory. Moreover, the display module is a television or computer monitor with picture-in-picture capabilities having a secondary display area in addition to a primary display area, wherein the television program is presented in the primary display area and the interactive application displayed in the secondary display area until a commercial break is detected, wherein upon detection of the beginning of a commercial break the interactive application is presented in the primary display area and the television program is presented in the secondary display area until the end of the commercial break is detected, whereupon detection of the end of the commercial break the television program is presented in the primary display area and the interactive application is displayed in the secondary display area.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of an embodiment of a system for detecting and automatically switching to an interactive application during television commercial breaks operating in accordance with the present invention.

FIG. 2 is a block diagram of an embodiment of a system for detecting and automatically switching to an interactive application during television commercial breaks operating in accordance with the present invention wherein the display module has picture-in-picture capabilities.

FIG. 3 illustrates an embodiment of a display module displaying a menu for programming the duration a commercial break timer.

FIG. 4 is a block diagram of an embodiment of a system for detecting and automatically switching to an interactive application during television commercial breaks operating in accordance with the present invention showing an interactive application module in detail.

FIG. 5 is a block diagram of an embodiment of a program memory connected to a remote source which stores a multitude of interactive application programs that can be downloaded to and stored in the program memory.

FIG. 6 illustrates an embodiment of a switching module with a means for deactivating the switching module wherein the means for deactivation is a manual switch locating in an "auto" position.

DETAILED DESCRIPTION

FIG. 1 shows a block diagram of a system for detecting and automatically switching to an interactive application during television commercial breaks operating in accordance with the present invention comprising television program module **10**, break detection module **20**, switching module **30**, interactive application module **40**, input module **60**, and display module **70**. In operating this system according to the present invention, television program module **10** outputs television program signal **100** which has visual and/or audio components. Television program module **10** can be a television receiver, a satellite receiver, a VCR, a DVD or CD player, or an HDD receiver. When television program module **10** is a television receiver, a satellite receiver, or an HDD receiver, television program module **10** receives television signal **11** via a cable network, a satellite network, or a ground based antenna and outputs television signal **11** as television program signal **100**. Alternatively, when television program module **10** is a VCR, DVD player, or other device capable of playing back recorded television signal **11**, television program signal **100** is generated from within television program module **10** by playing a VCR cassette, a CD or DVD, a magnetic disk, or other device that contains pre-recorded television programming. Television program module **10** transmits television

program signal **100** to break detection module **20** which in turn transmits television program signal **100** to switching module **30**.

Interactive application module **40** outputs interactive application output data **400** which has visual and/or audio components. Interactive application module **40** transmits interactive application output data **400** directly to switching module **30**. Switching module **30** then designates either television program signal **100** or interactive application output data **400** as primary display signal **300** and transmits primary display signal **300** to display module **70** for presentation. As used herein, presentation of a signal or data means displaying the visual component of a signal or data and outputting the audio component of the signal or data. Displaying a signal or data is merely displaying the visual component of that signal or data.

Display module **70**, which can be a television or computer monitor, is capable of presenting images and sounds according to the content of either television program signal **100** or interactive application output data **400**. Although not shown in FIG 1., display module **70** has a display screen for displaying images and a means for outputting sounds, such as speakers. The display screen has primary display area **71** for displaying a primary image. In standard televisions and computer monitors, primary display area **71** is essentially the entire display screen and is the customary area in which a user **50** will view a television program or an interactive application. The primary image displayed in primary display area **71** of display module **70** is the visual component of primary display signal **300** while the sound outputted by display module **70** is the audio component of primary display signal **300**. Whether the content of television program signal **100** or the content of interactive application output data **400** is presented by display module **70** depends on whether switching module **30** designates television program signal **100** or interactive application output data **400** as primary display signal **300**. When switching module **30** designates television program signal **100** as primary display signal **300**, the content of television program signal **100** is presented in primary display area **71** of display module **70**. Likewise, when switching module **30** designates

interactive application output data **400** as primary display signal **300**, the content of interactive application data **400** is presented in primary display area **71** of display module **70**.

Referring to FIG. 2, display module **70** can be a television or computer monitor with picture-in-picture (PIP) capabilities. If display module **70** has PIP capabilities, the display screen (not shown) of display module **70** further comprises a secondary display area **72** for displaying a secondary image in addition to the primary display area **71**. In PIP display module **70**, the primary display area **71** constitutes a majority of the display screen while the secondary display area **72** constitutes a smaller area of the display screen and is often contained within the primary display area **71**. Additionally, when display module **70** has PIP capabilities, switching module **30** is modified so that it is capable of transmitting secondary display signal **301** in addition to primary display signal **300**. In this embodiment, switching module **30** designates television program signal **100** and interactive application output data **400** as primary display signal **300** and secondary display signal **301**. The determination of how and when switching module **30** designates television program signal **100** and interactive application output data **400** as either the primary display signal **300** or the secondary display signal **301** will be discussed in detail below. Regardless of the designation, switching module **30** transmits primary display signal **300** and secondary display signal **301** to display module **70** so that the content of primary display signal **300** is the primary image presented in primary display area **71** and secondary display signal **301** is the secondary image displayed in secondary display area **72**. Moreover, in its default setting the sound outputted by display module **70** is the audio component of primary display signal **300** which is presented in primary display area **71**. However, display module **70** can be programmed so that the sound outputted by display module **70** can be the audio component of secondary display signal **301**.

Referring back to FIG. 1, television program signal **100** is transmitted to break detection module **20** before being transmitted to switching module **30**. While passing through

break detection module **20**, break detection module **20** monitors the content of television program signal **100** for the beginning and end of commercial breaks.

Television program signal **100** is designated as primary display signal **300** by default. Upon detecting the beginning of a commercial break, break detection module **20** generates break beginning signal **200** and transmits break beginning signal **200** to switching module **30**. The internal circuitry of switching module **30** is programmed so that upon receiving break beginning signal **200** from break detection module **20**, switching module **30** automatically designates interactive application output data **400** as primary display signal **300**. This results in the content of interactive application output data **400** being presented in the primary display area **71** of display module **70**. However, if display module **70** has PIP capabilities (as illustrated in FIG. 2), upon receiving break beginning signal **200** from break detection module **20**, switching module **30** will also automatically designate television program signal **100** as secondary display signal **301**. This results in the content of television program signal **100** being simultaneously displayed in the secondary display area **72** of display module **70** while the content of interactive application output data **400** is presented in the primary display area **71**.

Preferably, upon detecting or determining the end of a commercial break, break detection module **20** generates break end signal **201** and transmits break end signal **201** to switching module **30**. The internal circuitry of switching module **30** is programmed so that upon receiving break end signal **201** from break detection module **20**, switching module **30** automatically designates television program signal **100** as primary display signal **300**. Television program signal **100** is designated as primary display signal **300** until switching module **30** receives another break beginning signal **200** from break detection module **20**. This results in the content of television program signal **100** being presented in primary display area **71** of display module **70**. However, if display module **70** has PIP capabilities (as illustrated in FIG. 2), upon receiving break end signal **201** from break detection module **20**, switching

module **30** will also automatically designate interactive application output data **400** as secondary display signal **301**. This results in the content of interactive application output data **400** being simultaneously displayed in the secondary display area **72** of display module **70** while the content of television program signal **100** is presented in the primary display area **71**.

Optionally, break detection module **20** can be programmed so as to not automatically generate break end signal **201** upon detecting or determining the end of a commercial break. Instead, break detection module **20** can be programmed to generate break end signal **201** only when user **50** manually commands break detection module **20** to do so. This command can be entered by user **50** through input module **60**. This allows user **50** to operate the interactive application for as long as is desired. When display module **70** has PIP capabilities, this enables user **50** to monitor the content of television program signal **100** in secondary display area **72** while operating the interactive application in primary display area **71**, thus enabling user **50** to return the content of television program signal **100** to primary display area **71** only when user **50** so desires.

Referring to FIG. 6, the system of the present invention also has a means for deactivating switching module **30**, shown in the embodiment of manual switch **31**. Manual switch **31** can be slidably moved within switch channel **35** to three different positions: television position **32**; interactive application position **33**; and auto position **34**. When manual switch **31** is in auto position **34**, switching module **30** is active. However, when manual switch **31** is moved to television position **32**, switching module **30** is deactivated and television program signal **100** is permanently designated as primary display signal **300**. If the system has PIP capabilities, moving manual switch **31** to television position **34** also results in interactive application output data **400** being permanently designated as secondary display signal **301**. When manual switch **31** is moved to interactive application position **33**, switching module **30** is again deactivated and interactive application output data **400** is permanently designated as primary display signal **300**. If the system has PIP capabilities, moving manual

switch **31** to interactive application position **33** also results in television program signal **100** being permanently designated as secondary display signal **301**.

Referring again to FIG. 1, as mentioned above break detection module **20** monitors the content of television program signal **100** for the beginning and end of commercial breaks. The preferred method of detecting the beginning of a commercial break takes advantage of the fact that when the content of television program signal **100** switches to a commercial from an entertainment program, there is a detectable drop in the amplitude of television program signal **100** (i.e. a blanking screen). Break detection module **20** is programmed to constantly monitor the amplitude of television program signal **100** and detect drops in the amplitude. Upon detecting an initial drop in the amplitude of television program signal **100**, the internal circuitry of break detection module **20** is programmed to generate and transmit break beginning signal **200** to switching module **30** as discussed above.

In the present invention, the preferred method of detecting or determining the end of commercial breaks takes advantage of the fact that commercials and commercial breaks often last a predictable amount of time depending on time of day, geographical location, and day of the week. Typical commercial break duration times can be reasonably estimated through statistical analysis. In order to take advantage of this fact, break detection module **20** is programmed to have an internal timer that has a default setting or can be set by user **50**. The timer is activated and begins to count down upon break detection module **20** detecting the beginning of a commercial break. Upon expiration of the set time, break detection module **20** is programmed to generate break end signal **201**. For example, say user **50** programs the timer for two minutes. Upon detecting a commercial break and generating break beginning signal **200**, as described above, break detection module **20** activates the timer to start counting down. Upon expiration of the two minutes, break detection module **20** is programmed to generate and transmit break end signal **201** to switching module **30**. Moreover, break detection module **20** can be programmed so that the timer can have multiple default settings

for different days of the week, different geographical locations, and different times of the day such as morning, afternoon, and evening.

Referring now to FIGS. 2 and 3, user **50** can program the timer of break detection module **20** by communicating with interactive application module **40** via input module **60**. In response to choices **500** entered by user **50**, interactive application module **40** transmits timer programming signals **430** to break detection module **20** to set the timer. In order to facilitate user **50** to be able to set the timer, display menu **5** will appear on display module **70** when user **50** makes such a request via input module **60**. User **50** can program the timer by entering time values in corresponding entry boxes **2-4** in the display menu **5** via input module **60**. Interactive application module **40** then converts the values entered by user **50** in entry boxes **2-4** into time programming signals **430** and transmits time programming signals **430** to break detection module **20** in order to set the timer accordingly.

Another method in which break detection module **20** can detect the beginning and end of a commercial break is by "spooling" television program signal **100**. In this method, break detection module **20** receives television program signal **100** from television program source **10**. Upon receiving television program signal **100**, break detection module **20** is programmed to digitally record the content of television program signal **100** onto an internal memory (not shown) for a set duration of time before transmitting television program signal **100** to switching module **30**. This results in delayed transmission of television program signal **100** to switching module **30**. For reasons discussed below, the preferable recording length would be just longer than the approximate length of the longest commercial, which may be for example 1 minute. As discussed earlier, there is a detectable drop in the amplitude of television program signal **100** every time its content switches from an entertainment program to a commercial. Moreover, there is also a drop in amplitude between each commercial and between the final commercial of a commercial break and the return of the entertainment program. Break detection module **20** is programmed to monitor television program signal **100**

for these amplitude drops at the beginning of the "spooling" process. When break detection module **20** detects an initial drop in amplitude, break detection module **20** marks that spot of television program signal **100** as it is recorded on the internal memory. Thus, upon transmission of this first marked spot of television program signal **100** to switching module **30** one minute later, break detection module **200** is programmed to generate break beginning signal **200** and simultaneously transmit break beginning signal **200** to switching module **30**. This "spooling" method is also used to transmit break end signal **201** by taking advantage of the fact that commercials last a predictable amount of time, such as thirty seconds, forty seconds, or one minute for example. In this embodiment, break detection module **20** analyzes the spacing of the amplitude drops of incoming television program signal **100**. Break detection module **20** is programmed so that if the amount of time that passes after a drop in amplitude is detected is greater than a time determined to be sufficiently long enough to indicate that the content of television program signal **100** is not a commercial (for example one minute), then the spot of television program signal **100** where the last drop in amplitude occurred is marked. Upon transmission of this second marked spot to switching module **30** by break detection module **20**, break end signal **201** is generated and simultaneously transmitted to switching module **30**.

Optionally, break detection module **20** can be programmed to minimize the time in which the "spooling" method results in the content of television program signal **100** being displayed in non-real time (i.e. delayed). In order to achieve this, break detection module **20** is programmed to begin "spooling" television program signal **100** only upon detecting an initial drop in amplitude. Once an initial drop in amplitude is detected, break beginning signal **200** is generated and "spooling" of television program signal **100** begins as described above. Upon generating break end signal **201**, according to the method explained above, the internal memory of break detection module **20** can be programmed to drop a couple of frames per second while transmitting spooled television program signal **100** to switching module **30** so

that eventually spooled television program signal **100** will be the temporally the same as television program signal **100** as it is generated by television program module **10**. At this point, break detection module will stop "spooling" television program signal **100** and transmit television program signal **100** directly to switching module **30**. This results in the television program being shown in real time.

Referring to FIG. 4, in the illustrated embodiment, user **50** operates the interactive application as it is presented on display module **70** through interactive application module **40**. Interactive application module **40** comprises program memory **41**, input command interface **42**, central processing unit (CPU) **43**, pause memory **44**, and output means **45**. Interactive application module **40** generates interactive application output data **400**. Interactive application output data **400** is generated in accordance with the execution of an interactive application program which is stored in program memory **41**. Program memory **41** can be an external device such as a CD-ROM or a magnetic disc. Program memory **41** can also be an internal device such as an integrated circuit or a hard drive. The interactive application program contained thereon can be a video game, a word-processor program, a spreadsheet program, or an internet browser program.

Referring to FIG. 5, in one embodiment program memory **41** can be a local read and write memory that is connected to remote source **141** via download connection **140**. In this embodiment, remote source **141** stores a multitude of interactive application programs. Any of the stored interactive application programs contained on remote source **141** can be downloaded to and stored within program memory **41** via download connection **140**. Download connection **140** can be an internet connection through either a phone line or a cable line. Remote source **141** can be any computer or server accessible through the internet. If the download connection **140** is a cable internet connection, download connection **141** can either be the same cable connection that delivers television signal **11** to television program module **10** (FIG.1), or it can be a separate cable connection. The selection and downloading of

interactive application programs from remote source **141** is controlled by user **50** entering choices **500** into input module **60** (FIGS. 4 and 5).

Referring to FIG. 4, in order to control the content and generation of interactive application output data **400**, user **50** interacts with and controls the execution of the interactive application program by entering choices **500** into input module **60**. Input module **60** can be a mouse, a keyboard, or a hand-held controller. User **50** causes input module **60** to generate command signals **600** by entering choices **500** into input module **60** by a variety of methods, including pressing buttons, moving a joystick, or manipulating any type of input sensor on input module **60**. Upon choices **500** being entered into input module **60**, input module **60** converts choices **500** to command signals **600** and transmits command signals **600** to input command interface **42**. Input module **60** communicates command signals **600** to input command interface **42** via an electrical connection or via infrared signals. Where command signals **600** are communicated to input command interface **42** via infrared signal, input command interface **42** is an infrared sensor capable of converting infrared signals to electrical signals.

Upon receiving command signals **600** from input module **60**, input command interface **42** transmits command signals **600** to CPU **43**. CPU **43** then executes the interactive application program stored in program memory **41** as directed by command signals **600**. Execution of the interactive application program results in CPU **43** processing data read from program memory **41** according to command signals **600** and generating corresponding interactive application output data **400**. Interactive application output data **400** is transmitted from CPU **43** to output means **45**. Output means **45** then transmits interactive application output data **400** to switching module **30**. Output means **45** can be any type of port connection capable of completing an electrical connection with switching module **30**.

As user **50** continues to enter choices **500** into input module **60**, the interactive application program is progressively executed by CPU **43** according to the choices **500** made

by user **50**. Depending on the embodiment of the interactive application program, progressively executing an interactive application program can mean different things. For example, if the interactive application program is a video game program, progressively executing the video game may consist of user **50** controlling a character within a changing environment, completing consecutive levels, or obtaining a score. If the interactive application is a word processor program, progressively executing the interactive application will consist of writing sentences and progressively adding letters, numbers, or symbols to a worksheet. In both embodiments progressive execution of the interactive application builds on previous choices **500** made by user **50** in executing the interactive application program.

Referring to FIG. 4, in the preferred embodiment of the invention, the progress of user **50** in executing the interactive application program is automatically saved when the content of television program signal **100** replaces the presentation of the content of interactive application output data **400** in primary display area **71**. As discussed earlier, this occurs when switching module **30** receives break end signal **201**. Upon receiving break end signal **201**, switching module generates pause signal **303** and transmits pause signal **303** to CPU **43**. Upon receiving pause signal **303**, CPU **43** is programmed to automatically store the point of progress in executing the interactive application in pause memory **44**. Pause memory **44** is an erasable programmable read only memory (EPROM). As discussed earlier, at the beginning of the next commercial break, interactive application output data **400** will once again be presented in primary display area **71**. Upon receiving break beginning signal **200**, switching module **30** will designate interactive application output data **400** as primary display signal **300** and simultaneously generate unpause signal **304** and transmit unpause signal **304** to CPU **43**. CPU **43** will then read pause memory **44** and resume execution of the interactive application program and will correspondingly generate interactive application output data **400** according to the point of progress saved in pause memory **44**. This allows user **50** to execute the interactive application program progressively during consecutive commercial breaks without

having to start over. Pause signal **303** and unpause signal **304** can be transmitted to CPU **43** via an electrical connection or via infrared signal. Also, pause signal **303** and unpause signal **304** can alternatively be transmitted to input command interface **42** which would then transmit pause signal **303** and unpause signal **304** to CPU **43**.

It should be recognized that many of the signals and data that exist in operating the present invention can be transmitted to the intended device or module directly or indirectly through another device or module that is capable of communicating with the intended device or module. Furthermore, many of the signals, such as pause signal **303** and unpause signal **304**, can be generated from an alternate module or device, such as break detection module **20**.

While the invention has been described and illustrated in detail, various alternatives, modifications, and improvements should become apparent to those skilled in the art without departing from the spirit and scope of the invention.